527
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POPULARIZED WORDS.

THE English words in general use are simple and limited in number. The technical terms of the philosopher and specialist are foreign to the masses, and many thousands of authorized words, while employed by scholars, cannot be said to be in general use. This fact is well-known, but many may not have noticed how terms comparatively obsolete are sometimes popularized by circumstances. A new term applied to some excitement of the day will become a household word.

Just now, the peculiar and metaphorical word *inflation* is on every tongue. A year or more ago, who ever thought of that term in connection with finance? Since Weston's day, we have had many *pedestrians*, but no *walkers*. In New York city, *rapid transit* is familiar, even to newsboys. A Boston paper says: "The Hartford *kalsomined* the Lowell nine by 5 to 0." Lincoln was not *murdered* but *assassinated*. Two years ago, nobody spoke of *burning* the dead, but the most unlearned would say *cremation* as fluently and learnedly as though he had used the word for half a century.

Latin and Greek, together with their prolific offsprings,

Italian and French, sometimes make fearful havoc with our much cherished Saxon. The simple words which the nursery and primary school grafted in our vocabulary, and which we learned to use with such fluency and precision a score of years ago, are found not to be the popular and elegant terms of to-day. The terse, homely, but expressive Saxon of old Chaucer, while good enough for barbarians, seems incompatible with the esthetics of modern civilization. A man is not *sick* but *indisposed;* does not *get better* but is *convalescent;* never *dies* but *expires;* is never *hung* but *executed.* We no longer *steal* but *appropriate;* nor *lie* but *prevaricate.* There is no *sweat* on our brows, but we wipe away the *perspiration.* We do not *drive a boy to school,* but *enforce compulsory education;* and we never *whip* or *flog* him, but *inflict corporal punishment.* Our *barbers* have turned *members of the tonsorial profession.* The slang *too thin* has softened into the more euphonious *too transparent.* Some of our new colleges recognize no such thing as fall, winter, and spring terms, but first, second, and third *trimesters.* Probably, if the ghosts of Beowolf, Bede, Gower, Chaucer, and even of Ben Jonson, should appear to-day with their uncouth dialects, they would hardly dare open their mouths.

A college student, who became disgusted with the faculty's pedantry, attempted a modern version of the drama, "Mary had a little lamb." It ran somewhat as follows:

Miss Mary possessed, as her inalienable property, a diminutive specimen of the genus ovis. The delicate minute filaments, which grew in luxurious profusion on all portions of its exterior superficies, were as pure in color as the frigid congealments of a wintry sky. To whatever region of this sublunary sphere—whether in the remote wilds of oriental lands, or within the parietal bounds of her paternal plantation—Miss Mary's disposition inclined her, this delectable herbivore was morally certain to accompany her. It so happened that on one beautiful morning, as Mary wended her thoughtful way to the abode of learning, the little quadruped unwittingly disregarded a long-established regulation, and boldly entered the classic door, in the immediate companionship of its beloved mistress. The ornaments of the rising generation, drinking deep at the fountain of intelligence, were unaccountably filled with a frivolous spirit of ludification, which manifested itself to the intense per-

turbation of the presiding genius, who, true to the noble instincts of her race, assumes an erect position, and advancing to the neighborhood of the innocent little aries, violently thrusts it beyond the threshold of the literary sanctuary. Daunted not, however, by this metastasis, the cosset continued to occupy a portion of ground adjacent to the edifice, until its loving mistress appeared. The children, filled with a laudable anxiety to peep into the mysteries of brute psychology, inquired of the school functionary the cause of the lamb's extraordinary and uncontrollable passion for Miss Mary. To these "rising ideas," the pedagoguess ejaculated, "The undying affection for Miss Mary, which reigns supreme in the breast of the ruminant quadruped, is caused by a similar endearment in the sympathetic heart of his biped mistress."

PARROT READING.

UNDER the above caption, we propose to answer the oft-repeated question: "In teaching reading, should the teacher read *first?*" In the outset we answer, *no:* unqualifiedly and emphatically, NO. Let it be borne in mind that "good oral reading consists in the correct expression of the *thoughts* and *feelings* of another as they are represented to the eye on the printed or written page." It is not simply "the naming of words in a given order, calling them readily, and giving them their proper pronunciation." Neither does it consist in calling these words just as another has called them—it is not *imitation.* It is the expression of *thoughts* and *feelings.* This being true, it must follow that the first step in reading is to master the thought. The thought must be comprehended before it can be expressed. Just here is the great stumbling block in the teaching of reading; children are allowed to read (?)—to attempt to express thought before they have any thought to express—before they have either mastered the words or comprehended the ideas. True, children may be taught to *call words* correctly; they may be taught to imitate the tones and gestures of the teacher; but this does not answer our definition of reading.

If you wish to teach children to sing a given song, or a limited number of songs, the *quickest* process is to do it by rote —to sing and have the children sing. But when you have taught a song in this manner, you have given the children nothing that will enable them to sing a new piece until they have heard it sung by some one else. They have not been helped in the least to become independent singers—to read music for themselves. It is a slow process, certainly, to teach songs by first teaching the principles of music—by teaching children to make sounds that are indicated by the notes, and yet by this method every song that is learned makes it easier to sing the next without help, and the process followed out makes independent readers of music.

It is well known that the most successful teachers of music are people who cannot sing. This can be accounted for by the fact that the poor singers, not being able to teach by rote, compel the children to rely upon themselves, and thus they become independent singers; while teachers who sing well themselves, frequently secure the poorest results, for the reason that their voice always directs the singing, and the children become accustomed to follow a *leader*. The same principle holds in the teaching of reading. The easiest and quickest way to teach a limited number of pieces is for the teacher to read and have the children imitate, lead and have the children follow; but it is one of the poorest and slowest processes by which to make independent readers. Just as a parrot may be taught to speak certain words without at all comprehending their meaning, so children may be taught to imitate the reading of the teacher without at all comprehending what they express; but this is *not* reading. Children should be taught to read by requiring them (1.) to master the words as to their pronunciation and meanings; (2.) to comprehend the thought of the sentence or paragraph; (3.) to express these thoughts. The ability to take the third step always depends upon the manner in which the first two have been taken. In nine cases out of ten, when a child fails to read a piece correctly, he fails because he does not fully comprehend the thought, and the best way to help him is not to read it for him and have him imitate, but to remedy the difficulty—to help him *understand* what he is reading.

We do not say that the teacher should never read for his pupils—that he should never give them an example—we know that this is often necessary; but we do mean to say that the *rule* should be that the children should be made to read correctly, by making them *comprehend* what they are to read—that the teacher's voice should be the *last* resort and not the *first.* —*Indiana School Journal.*

TWO METHODS OF COMPOSING.

THE majority of pupils find composition the hardest task of their course. They are troubled not only to write well, but to write at all. Strange it is, too, that a proficiency in other departments seems to be no index of ability in writing. There are students in our colleges who, while they translate the languages with ease and elegance, follow a demonstration in mathematics with a positive relish, recite rhetoric verbatim, and comprehend Mill at sight, cannot, even with the intensest effort, compose a flowing sentence, or record a thought, which to them seems other than plebeian. On the other hand, there are men in every class who make no effort to excel, yet, in some way or other, have acquired a faculty of composing with readiness and excellence. Now it would be consoling to such as find it difficult to write, were it a fact that really great authors were thus hampered during the early development of their powers. Unfortunately such is not the case. Byron wrote as rapidly at eighteen as when he composed "Childe Harold." At twenty, Scott had the same rapidity as when he wrote the "Lady of the Lake." Most of the brilliant writers have been characterized by the peculiarity of composing without hesitation.

This leads me to consider the two modes of composing. The one, to construct every sentence with care, to think twice on every point and undergo a mental struggle in the selection of words. The other, to write each sentence as the first impulse of the mind suggests, to make little of a studied form of expression, to think but once.

He who employs the first, labors slowly, aims rather at excellence in individual sentences than at the good effect of the

whole composition; and expects that practice will enable him to write with as much rapidity as his now less particular contemporary. His long-continued labor always tires and often disgusts him, and his most elaborate efforts are the least satisfactory.

He who employs the other method, fills a page as easily as a line; he seeks only to make each sentence reasonably clear, and expects that practice will enable him to write with as much exactness as his more particular rival. To him, writing is a pleasure. The speedy completion of his task always preserves its novelty, and he feels very little disappointment when remorseless critics pronounce his effort hardly worthy of Macaulay.

Whatever may be the preferences of others as to these methods, I am not slow to proclaim my belief in the latter. Study the early compositions of men who have become the masters of style, and observe that they are written with a haste that is evidently reckless and certainly intentional. Bulwer, when eighteen, wrote "Pelham," one of the most voluminous of his works, in the short space of a fortnight. Fielding, at the age of twenty-two, composed "Tom Jones," one of the longest novels in print, during the month of September. Dumas, the elder, was wont to force himself to fill, between the hours of ten and two, manuscript sufficient for a popular novelette. Nevertheless, the works of these authors are among the most popular of the day. To what can we attribute this fact? These compositions, coming fresh from the author's mind, are more natural, more graceful, and, consequently, more popular than those which are the result of toilsome ponderings, and which veritably "smell of the lamp." The labored productions of Johnson are scarcely to be found, save in the library of the savant; while the "careless table-talk," which Boswell so diligently preserved, will be read and admired as long as Englishmen exist.

Does not this explain the fact that many an ordinary scholar is a very acceptable writer, and that many an able student makes a poor figure with his pen? The exactness which sound scholarship requires has little in common with the license which popular writing indulges. Let the young writer pen his sentences as they suggest themselves, and rest assured that the day will come when his thoughts will flow from his pen in a dictum at once natural and elegant. E. O. T.

HIGHER EDUCATION IN SCOTLAND.

IN Scotland, education is receiving more than its usual attention. An effort is being made to raise the character of the grammar schools, and with what success will appear in the following, which is condensed from a letter to the *Nation*. The parochial system, which prevailed from the time of John Knox till the year 1872, or for nearly two centuries, is well known. The theory of the Scotch reformer was that in every parish in Scotland, a good elementary school should be established in close connection with the parochial church, the minister of which should superintend the education of the children, while the land-owners in the parish should bear the expense of the school. In each important town in Scotland he desired to see high schools, or grammar schools, in operation, in which the secondary education of the more promising boys from the parochial schools should be conducted; and in two or three of the largest towns, universities were to exist, in which ministers, lawyers, and doctors, and the eldest sons of country gentlemen, should be educated in the higher branches of learning.

This system was instituted by Act of Parliament, and carried out, but only in part. Schools were founded in every parish, and universities were established in the four towns of Aberdeen, Edinburgh, St. Andrews, and Glasgow, situated in the north, south, east, and west of Scotland respectively. But the middle portion of John Knox's programme was never accomplished. What he would have called grammar, and we should call secondary, schools, have never found a place in the educational economy of Scotland.

Under these circumstances, it is impossible to look for a high type of education in Scotland. You have, thanks to the parochial schools, the elements of an English education more widely diffused than in almost any other country in the world, except, perhaps, America. But the secondary education of the country is of a humbler type, and superior education can hardly be said to have any existence. Scotch boys who are desirous of procuring an education of a superior kind must go to England for it. The refinements of classical education, such

as are the staple of the education given at the universities of Oxford and Cambridge, are unknown north of the Tweed. The professors in the Scotch universities are men of the same mental calibre as those in the English universities, and most of the best-known among them were, in their day, distinguished members of the English universities. The raw material of the Scotch student is probably superior to that of the English student, certainly it is not inferior. But the school training of the English boy is what the Scotch boy wants. There are no schools such as Eton, or Harrow, or Rugby, or Winchester, in Scotland. There are no grammar schools which can be compared with those of Clifton, or Uppingham, or Marlborough, or a dozen others which might be named. The best of the Scotch youth are drafted off each year to the English schools, and educated in them, and from these schools they proceed, like their English school-fellows, to the English universities.

The question which at present is occupying the minds of Scotch educational reformers, is how they can improve their secondary schools. Three years ago, an important measure was passed by Parliament for the improvement of Scotch education. Its object was to establish schools wherever they are wanted, and these were to be managed by school boards, elected in each parish and burgh by the rate-payers. So far as elementary education goes, the Act is working well, but it makes no provision for secondary education, which is carried on by the universities, by a few private schools, or academies, and by one or two grammar schools, in the larger towns. The universities are, to some extent, degraded by this arrangement, and the authorities in these institutions are as desirous as the public of improving on it. The education given in private schools or academies is never first-rate, the proprietors of such institutions being generally driven by the exigencies of fortune to the necessity of underpaying the teachers and overcharging the pupils. And one or two grammar schools, even if they had a fair field and were not undersold by the universities, cannot supply an adequate education to a considerable country like Scotland. The establishment, therefore, of a good system of secondary education in Scotland is the question of the future. The problem of educational reformers is this: From what sources can funds be provided for this object?

There are three possible sources—Parliamentary grants, ancient endowments, and private subscriptions. Parliament has not been asked directly to sanction grants in aid. But the improbability of the House of Commons, in its most generous moments, sanctioning the expenditure of public money on schools which are principally used by those whose parents are able to pay, is so great, that no legislator has yet been found bold enough to make the experiment. Ancient endowments exist in Scotland to the extent of some £200,000 a year, and if the trustees could see their way to depart to some extent from the expressed intentions of the testators, the secondary schools of Scotland might be placed on the best possible footing. But the trustees are, for the most part, men who are loath to part with their trusteeship. Educational reformers, therefore, fall back upon the third possibility, and are beginning to think of organizing societies for the better endowment of the secondary schools of Scotland. The object is excellent, but the difficulties are considerable. People will subscribe sums of money when either their political or their ecclesiastical feelings are excited. Whether they will do so merely for an academical project is a question.

ON the subject of tests in pronunciation, an exchange presents the following:

1. A courier from St. Louis, an Italian with italics, began an address or recitation as to the mischievous national finances.

2. His dolorous progress was demonstrated by a demonstration, and the preface to his sacerdotal profile gave his opponents an irreparable and lamentable wound.

3. He was deaf and isolated, and the envelope on the furniture at the depot was a covert for leisure and reticence from the first grasp of the dancing Legislature of France.

4. The dilation of the chasm or trough made the servile satyr and virile optimist vehemently panegyrize the lenient God.

5. He was an aspirant after the vagaries of the exorcists and an inexorable coadjutor of the irrefragable, yet exquisite, Fariago, on the subsidence of the despicable finale and the recognition of the recognizance.

ABOUT ASBESTOS.

ASBESTOS is one of the most interesting of minerals. It is the only flexible fibrous substance that is perfectly indestructible by fire or acids, notwithstanding it consists of fibers as fine as the finest linen.

Since this mineral has been brought into such practical importance of late, something as to its history and properties will not, perhaps, be unacceptable.

The word asbestos is from a Greek root, signifying indestructible or unaffected by fire. Several varieties of the mineral have different names—Amiant, Byssolith, Mountain-wood, Mountain-cork, Mountain-leather, etc. They are all silicates, that is, compounds of silex (silicic acid) with an earthy base. The greater number of them are hydrated silicates, but all varieties are distinguished by a crystalline fibrous structure, possessing a certain amount of flexibility and elasticity, of which sometimes the whole mass partakes as well as the single fibers. In former years, deceived by the idea that this property belonged exclusively to a certain chemical combination, the different varieties of asbestos were supposed to be identical in elementary composition; but we know at present that the asbestos form belongs to no exclusive mineral. It is only a peculiar condition under which many minerals may present themselves. Much of what is called asbestos is a variety of the very common mineral hornblende, which in its most perfect form, exists as handsome black crystals. These minerals, hornblende and asbestos, so unlike in appearance, are placed near together in museums, on account of their similar chemical composition.

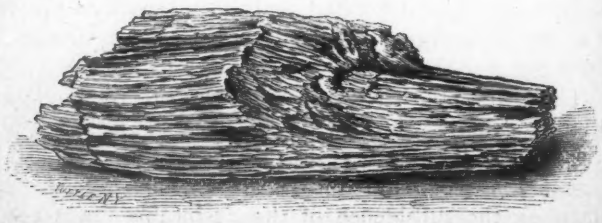

FIG. 1.—Lump of asbestos as found.

FIG. 1 represents asbestos as found in the mines. It is always fibrous like wood, and often looks very much like half-decayed wood buried in the ground; hence some varieties are called mountain-wood. When the fibers, which always lie very closely and compactly together, are separated, it looks very much like flax, with a silky luster (see Fig. 2). The fibers are of various lengths, which lengths vary with the quality as found in different localities.

FIG. 2.—Asbestos fibers unravelled.

The properties of this substance have been known for ages. Pliny supposed it to be a vegetable product, although good for making incombustible cloth, as he states. The *amianthus* of the Greeks was the same thing; the word meaning undefiled, and alluding to the faculty of cleaning cloth by throwing it into the fire. The colors vary from white to green and wood-brown. The name amianthus is now applied to the firmer and more silky kinds. Mountain-leather is a kind in thin flexible sheets, made of interlaced fibers and mountain-cork. The individual crystals of asbestos are easily separated from each other, are very flexible and elastic, and have a fine silky luster. A single fiber fuses into white enamel glass, but in the mass, it is capable of resisting ordinary flame, so that it has been extensively applied in the manufacture of fire-proof roofing, flooring, steam packing, clothing, and lamp-wicking. The ancients wore a cloth out of it, for the purpose of wrapping up the bodies of the dead when exposed on the funeral pile. They also made napkins of it, which were cleansed by throwing them into the fire. The finer varieties were employed for the wicking of votive lamps. Gloves, for handling hot iron, and firemen's clothing, have been made of it in Bohemia and France.

In regard to spinning and weaving asbestos, and using it for paper pulp, it ought to be remarked that most kinds cannot

be used thus without the intermixture of cotton or linen fiber, as, in many varieties of asbestos, the fibers are not quite long enough. The intermixture of longer fibers makes the operation quite easy, and when the fabric is entirely ready, it is simply placed in the fire, when the combustible linen or cotton is burned out, and the incombustible asphalt texture remains.

It is an excellent material for the chemist as a filter. Being a silicate, it will filter acids which would destroy the ordinary filters.

Asbestos mines are found in Switzerland, Italy, Scotland, and on the Island of Corsica. In this country, it occurs in various localities. The largest deposits are controlled by Mr. H. W. Johns, of New York, through whose instrumentalities many uses have been made known of a substance of which the public, without him, might have remained utterly ignorant.

In preparing roofing material, asbestos is reduced to a kind of flock, forming the basis of a compound which is applied to a strong canvas. This is nailed upon the roof, and afterwards painted over with asbestos roof-coating, which consists largely of the mineral. Various non-conducting articles, such as felt, board, cement, etc., for protecting wood-work which is exposed to fire, are made largely of asbestos, and are also used to cover boilers and steam-pipes, to prevent the loss of heat. The material has also been employed in making fire-proof safes. One of the most recent applications of asbestos is in the making of steam-packing, to use around the piston-rods and other moving parts of an engine, where a steam-tight joint is needed; for this purpose, it is spun into ropes of different sizes. Indeed, so many uses have been found for what was recently a mere curiosity, that we shall, by-and-by, wonder how the world managed to do without asbestos.

THE ladies propose to erect a colossal bust of Washington Irving in Central Park. The plan is to have it finished in season for the Centennial Exhibition at Philadelphia, and to set it on a splendid granite pedestal in the Park afterwards. It is a very proper thing to do, and for ladies especially, as he showed his regard for the fair sex by remaining unmarried.

*HOW TO TEACH.**

ARITHMETIC.

DECIMAL FRACTIONS.

THE exact nature of decimal fractions should be explained and illustrated; also the meaning of the word *decimal.* Show that decimal fractions may be used like common fractions by writing the denominator. Illustrate by the decimal notation, showing that whole numbers greater than 9 are also expressed *decimally.*

Show also that decimal fractions are really only a kind of common fractions, the two having the relations of species and genus. The methods of writing, and the various analyses are essentially identical, case for case, as shown by the following syllabus.

The illustrations may embrace the following:—1. How to write decimals, as 7-tenths, 7-hundredths, 7-thousandths, 7-ten-thousandths, etc. 2. Show that the *numerator* is FIRST written, as in common fractions. 3. Show that the "decimal point" and the ciphers, when used, are only required to *indicate* the *denominator.* 4. In *reading* decimal fractions, the pupils should be cautioned to avoid such expressions as "tens of thousands" for *ten-thousandths,* "hundreds of thousands," for *hundred-thousandths,* etc., etc. In connection with the reading of such fractions, pupils should be trained to recognize readily the comparative value of different fractions; as that .3 is greater than .0987 or .01 than .009596, etc. They may also be made to perceive readily the *approximate value* of decimals as compared with simple common fractions; as, that .7634 is a little more than $\frac{3}{4}$; that .8741 is somewhat less than $\frac{7}{8}$, etc. Previous to this, however, it is well to teach the exact value of certain decimal expressions: as $.75=\frac{3}{4}$, $.125=\frac{1}{8}$, $.375=\frac{3}{8}$, etc. These exercises will serve to render the subsequent work of the pupil intelligible.

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*From "How to Teach," by the New York City School Superintendents.

Syllabus of Topics.

I. Exercises in READING decimal fractions.

Exercises in telling how many places are necessary for a given denominator, and *vice versa*.

Exercises in *writing* decimal fractions.

Reduction of decimal fractions:

1st. *By Inspection*, with analysis as in common fractions.

Examples, mental, oral, and written.

.3 to .00's, to .000's, etc.; .15 to .00000's. To higher terms, *Analysis* C, common fractions.

3 to .0's, to .00's, to .000's, etc.; 7.3 to .0's, to .000's, etc.; to improper fractions.

Reduce .700 to *lowest* DECIMAL *terms*.

NOTE.—Avoid saying "the ciphers to the right are crossed off because they are of *no use*." The statement that "they do not affect the value," is not satisfactory unless the pupils show why they do not.

II. *Reduce common fractions to decimal fractions.* Give *Analysis* E.

Use axiom—$\frac{3}{4}$ of a unit $=\frac{1}{4}$ of 3 units; $\frac{3}{4}=\frac{1}{4}$ of 3.

Make this definite by objective illustration, using lines divided into parts.

Example.—$\frac{3}{4}$ to tenths; to hundredths; $\frac{3}{4}$ of $1=\frac{1}{4}$ of $3=\frac{1}{4}$ of 30 tenths $=7\frac{1}{2}$ tenths $=.7\frac{1}{2}=.75$.

NOTE.—Pupils should be accustomed to read decimal fractions, especially hundredths (in subsequent grades applied to per cent.), so as to include outstanding fractional parts, where there are any.

It is generally better to state what denominator is required, instead of the more indefinite requirement to "reduce to a decimal fraction."

Example.—Reduce $\frac{4}{11}$ to a decimal fraction of two places, or reduce $\frac{4}{11}$ to hundredths.

Ans. Two places will give hundredths for the denominator.

$$\frac{4}{11}=\frac{1}{11}\text{ of }4=\frac{1}{11}\text{ of four-hundred hundredths}=11\overline{)4.00}\quad .36\tfrac{4}{11}$$

$$\text{Reduce }\frac{240}{320}\text{ to a decimal: }\frac{240}{320}=\frac{24}{32}=\frac{3}{4}=\tfrac{1}{4}\text{ of }3=\tfrac{1}{4}\text{ of }300\text{ hundredths}=4\overline{)3.00}\quad .75$$

Rule 1. 1st. Reduce the numerator, considered as a whole number, to an improper fraction with the required denominator. 2d. Divide by the given denominator. Or,

Rule 2. Divide the numerator by the denominator.

NOTE.—Give examples to show what common fractions in their lowest terms *can be made entirely decimal,* and which *can not.* In the general work of the class, pupils should rarely be required to continue the division beyond three or four places.

Reducing Decimal Fractions to Common Fractions in their Lowest Terms.

Rule.—Write the fraction as a common fraction and reduce to lowest terms. *Analysis* D, common fractions.

Examples: .625 .4125 .87500 14.125

" .07¼ .3⅓ .66⅔ 5.11⅛ .87½

NOTE.—Pupils should be made thoroughly familiar by rapid mental exercise, usually without analysis, with the decimal expressions for halves, 3ds, 4ths, 5ths, 6ths, 7ths, 8ths, 9ths, 11ths, 12ths, and *vice versa,* using preliminary reduction to lowest terms whenever possible, as in $\frac{9}{12}$, $\frac{4}{8}$, etc., etc.

III. *Addition of Decimal Fractions.*

Examples: Add .2, .05, .008, .7283. Add .0005, .97, .0101, etc.

" Give mixed numbers.

Analysis as in common fractions, by principle of reducing to lowest terms. The necessary additional ciphers may be "understood" in the solution, but not in the oral analysis, which should be *as brief as possible.*

IV. *Subtraction of Decimal Fractions.*

Examples: .1 — .075; 1.001 — .01009, etc.

Explain as in common fractions, with the same analysis.

V. *Multiplication of Decimal Fractions.*

NOTE.—Do not give large denominators. *Use the brief rule of common fractions. Cases* as in common fractions.

1st. When a fraction or a mixed number is to be *multiplied,* as:

4 times .75, 17 times 8.047.

Value of 13 barrels at $8.375 a barrel.

2d. When a *fractional part* is to be taken, as:

.4 of .83, .4 of 75, .4 of 8.75.

How much is .7 of $38.45? .079 of $120? .90¼ of $160.48?

Value .179 of ton @ $92 a ton? at $92.87½ a ton?

3d. Combinations of the 1st and 2d cases, as:
3.4 lbs. at 79 cts. a lb.? $.79 \times 3.4$.
8 cwt. 75 lbs. @ $2.47 a cwt. 2.47×8.75.

NOTE.—As preliminary to 2d and 3d cases, give mental exercises in finding the *product* of two decimal denominators, as "10ths by 10ths, how many places?" "1000ths by 100ths, how many places?" etc., etc.

Examples of cases involving reduction:

$.024 \times .15 = ?$ Product of numerators, $24 \times 15 = 360$, the new numerator, 1000ths by 100ths = 100.000ths, or 5 decimal places for denominator. *Ans.* .00360 = in lowest decimal terms .0036. Why cross off the last 0? To divide both terms by 10.

NOTE.—Many questions are as well solved by the application of principle (E) in common fractions.

.079 of $14.83 = .001 of 79 times $14.83, etc., etc.

Use or not as may be judged expedient.

VI. *Division of Decimal Fractions.*

There are two cases, as in common fractions:

1st. When the divisor is *an integer:*

$7 \div 8$, $8 \div 7$, $6 \div 5$, $6 \div 120$, $7.2 \div 6$, $3.6 \div 120$, etc. Put question in several ways: 1st, Divide 7.2 by 6; 2d, How much is $\frac{1}{6}$ part of 7.2? 3d, How many times is 6 contained in 7.2? etc., etc.

This simple case does not require the principle of the common denominator.

2d. When the divisor is or contains a *decimal fraction:*

$6 \div .03$; $.8 \div .005$; $.004 \div .8$; $.0036 \div .024$; $7.2 \div 009$; $8 \div 5.45$; $3 \div 7.203$; $.2 \div 8.75$; $.3006 \div 7.4$; $8.5 \div 9.78$; $8.638 \div 9.5$; $8.638 \div 4.3$, etc., etc.

Solution and analysis by the principle of common denominator.

There are two forms of applying this principle:

1st. Where the denominator of the divisor is the *greater*, (.003).6,) INCREASE the denominator of the dividend to .000's.

2d. Where the denominator of the divisor is the *less*, (12).17286,) DIMINISH the denominator of the dividend to .00's (hundredths) by cutting off the last three figures.

A General Rule.—1st. Reduce the denominator of the dividend to the denominator of the divisor; 2d. Divide the numerator of the dividend by the numerator of the divisor.

The quotient will then be a whole number. Other decimal places either added to the dividend or cut off from it, are to be "brought down" in the further division, and will give the fractional portion of the quotient.

Applications.—The applications of decimal fractions will be principally found in Federal Money. Simple combinations with common fractions should occasionally be used; also simple combinations of two or more of the rules of decimal fractions.

Use the principles of *cancellation* and *reduction to common fractions* whenever they will simplify the operation.

Examples in finding what *decimal fraction* one decimal fraction is of another; especially how many *hundredths*—use ONLY small amounts or very simple examples:

8 cents, how many hundredths of 64 cents?

$7.25, how many hundredths of $9.75?

SUPPLEMENTARY NOTE TO THE ARITHMETIC OF THE FOURTH GRADE.

Particular attention is directed to the three following elementary and mutually related problems, and to their importance as the essential preparation for the commercial arithmetic of the higher grades.

1st. To take a fractional part of a given number: Fundamental.

Common Fractions.	*Decimal Fractions.*
How much are $\frac{3}{4}$ of 15?	How much are .75 of 15?
How much are $7\frac{1}{3}$ times $9\frac{1}{2}$?	How much are 3.48 times 7.53?
Value of $4\frac{3}{8}$ yards @ $\$5\frac{4}{7}$ a yard?	Value of 8.47 tons @ $3.45 a ton?

Percentage.

Find 75 per cent. of 15?

Find $62\frac{1}{2}$ per cent. of 8.75?

Find $87\frac{1}{2}$ per cent. of $\$48.37\frac{1}{2}$?

2d. To find what (fractional) part one given number is of another given number: Derived.

Common Fractions.	*Decimal Fractions.*
6 is what com. frac. of 15?	6 is what dec. frac. of 15?
	6 is how many 100ths of 15?
$7\frac{1}{2}$ is what com. frac. of $9\frac{1}{2}$?	$7\frac{1}{2}$ is what dec. frac. of $9\frac{1}{2}$?
	$7\frac{1}{2}$ is how many 100ths of $9\frac{1}{2}$?
$\$4\frac{2}{3}$ is what com. fr. of $\$5\frac{1}{4}$?	$\$4\frac{2}{3}$ are what dec. frac. of $\$5\frac{1}{4}$?
	$\$4\frac{2}{3}$ are how many 100ths of $\$5\frac{1}{4}$?

Percentage.

6 is what per cent. of 15?
$7\frac{1}{2}$ is what per cent. of $9\frac{1}{2}$?
$\$4\frac{2}{3}$ is what per cent of $\$5\frac{1}{4}$?

3d. To find the number of which a given number is a given fractional part: Derived.

Common Fractions.	*Decimal Fractions.*
85 is $\frac{5}{8}$ of what number?	85 is .625 of what number?
$2\frac{1}{2}$ is $\frac{1}{7}$ of what number?	18.75 is 1.3 of what number?
$\$8\frac{1}{4}$ are $\frac{1}{8}$ of what sum?	$9.25 are 1.25 of what sum?

Percentage.

85 is $62\frac{1}{2}$ per cent. of what number?
Or $\left.\begin{matrix}8\frac{8}{9}\\8.45\end{matrix}\right\}$ is 11 per cent. of what number?
$12.60 are $87\frac{1}{2}$ per cent. of what sum?

A student in U. S. History being asked, in an examination, to give a brief geographical sketch of Washington, sketched him thus: "Washington was one of the leading generals of the Revolutionary War, and also the boy who never told a lie." Another member of the same class asserted that, "The war of the Revolution was fought at the battle of Bunker Hill, in April, 1775," and that "Corn Wallis" was a British general who came over from "Yourp" to conquer the Yankees, because they would not pay the tax on tea.

THE KIND OF TEACHING NEEDED.

I KNOW I shall be told, as I often have been, that there is no use of endeavoring to instruct the young to make them masters of the means of leading their fellow-men by oratory; that this is a natural gift acquired at birth, which can no more be created than taken away. To this I can only reply that, in my experience many years ago, while officially visiting the Primary School in the town where I reside, I took some pains to observe the difference in progress between the children there taught to read. I soon perceived that some learned quicker and some better than others, but that none were unable to learn by teaching. I further discovered that one teacher could do a great deal more with all scholars than another, but I nowhere found children able to read at first sight, or, if left alone to get on as best they could, proving good readers at once. So I have met with very bad readers coming from very good schools. As a general rule, the reading followed the will of the teacher. All this did not convince me that any one child was an orator born like Minerva, out of the brain of Jove. What is thus said of primary schools is equally applicable to all advanced teaching in this or other branches of knowledge. It will not be really effective unless the spirit of the teacher be communicative to his pupil, as by an electric chain. This sort of teaching is the want of the present age. All the born speakers it has been my lot to hear have betrayed more or less deficiency. I can think of but one thoroughly accomplished speaker in the commonwealth, and he never failed to impress the hearer with confidence springing from the most careful culture. I have heard many speak well who would have done much better if they had good advice. Away then, with all this nonsense about innate oratory or dancing-school instruction! The germs of this power may be more thickly sown in one man than in another, but their full development can only be the result of careful education, and when the full man comes forth before the view of his fellow-men, where shall ye find a more efficient instrument of good?—*Charles Francis Adams.*

AN ACTIVE VERB—WHAT IS IT?

THE old rule, "Active verbs govern the objective case," is very convenient as a grammatical formula. And yet it is no truer than the still older formula, "the sun rises." In each however, the *seem*ing is so strong as to justify the falsehood. And all nations will doubtless, to the end of time, continue to use them both.

A verb is simply a noun (a name), with a predicating function (a *do*-power) added to it. When the noun past denotes an act or a feeling, this act or feeling may be asserted in a general way, that is, with no specific and expressed limitation; as the clock strikes, John strikes, the horse kicked, God loves, all good men love, the horse eats, all animals eat, the horse runs, the ox walks, the babe smiles, sleeps, etc.

Here the verbs, *strike*, *kick*, *love*, etc., are all alike, neuter or non-governing; that is, non-limited. In other words they all alike assert the act, state, or feeling respectively named by them, and they all alike fail to have any limitation or any other modification of the act, state, or feeling. And these modifications are all omitted with any other verb of our language, whenever a speaker has no need of them. And in the sentence as above, made with verbs some of which are usually active and others always neuter, the speaker wished simply to predicate of "John" the *act*, and of the "clock" the *habit*, of striking; of the "horse" the *past act* of *kick*ing,—the *present habit* of *eat*ing (without any reference whatever to *hay*, *corn*, or *oats*), and the *present act* or the *present habit* of *run*ning. And so of the rest.

Now these verbs may all alike be modified internally by adverbs; as, The clock [or John] strikes fast (=does a fast striking), the horse kicked hard (=made a hard kick),—eats slowly, or slow (=does slow eating) and runs fast; and the babe sleeps soundly, or sound—smiles sweetly, etc. And so may they all alike be limited externally by a terminus ad-quem; as, *the clock strikes* THE HOURS, *John strikes the* WALL, *the horse kicked his* OWNER, *eats* HAY, *runs to his* MASTER, *the ox goes to the* CRIB, *the babe smiles at* ME—*sleeps till* morning. Now these modifying nouns, each of which is external to its verb, all alike,

give both direction and limitation to the act, state, or feeling denoted by the noun-past of the preceding verb. But some of these verbs take this limiting noun *im*mediately (without an intervening word), while the others take it with a preposition between. The latter are all neuter (=non-governing), verbs, while the former are all active (=governing) verbs; that is, noun-limited.

The active verb then is simply a neuter verb with a connective power or prepositional function added and now inherent in it. And this *connective power* is its *activity*, is just what is meant and all that is meant by when we call it active. There is no transitiveness or "passing-over" in the matter. There is not necessarily any activity whatever in the subject of the verb. Often, indeed, there is perfect stillness and sometimes death; as, John owns a horse: That dead man strongly resembles his father. Here "owns" and "resembles" are active, but their subjects are not. And certainly neither subject nor predicate (neither nominative nor verb), expresses any "passing-over."

Very unfortunate is the duplication of names in grammar, such as *active* and *transitive*, *mood* and *mode*. So multiplex have vanity and folly made the names of the tenses, that duplication does not fully express the mischief with some of them. Kirkham, when he first introduced *Transitive* and *Intransitive* for *Active* and *Neuter*, felt their falsity with such verbs as, *have*, *own*, *resemble*, etc. And hence he taught that though these verbs do not *pass over* to their objective case, yet "they have an immediate reference to it." Here, Kirkham was right as to his immediateness between an active verb and its limiting noun, but right in nothing else. His motion of *passing over*, which has greatly damaged both lexicography and grammar ever since, is utterly false. And so is Swinton's about complete and incomplete verbs. *Eat*, *love*, and *strike* are usually active verbs. And if any verbs are incomplete without a limiting noun, and thus incapable of a full predication or statement without such help, these certainly belong to that class. And *sleep*, *go*, and *die* as certainly belong to the class of neuters or complete verbs. And yet we can, with perfect propriety, say of a convalescent, *He both* EATS *and* SLEEPS *well;* of an ardent wooer, *He* LOVES *hard, and* GOES *often to see Ann;* and of an

enemy, *He* STRUCK *at me, and* DIED *of spite*, because he failed to hit me.

Not only are active and neuter verbs perfectly alike in every attribute and feature, except the non-use with the one, and the use with the other of a following preposition, but the verbs of each class often pass into the other; and sometimes the same verb belongs to both classes. Thus, we can say with equal propriety, My son, on the 4th inst., attained his majority, or attained *to* his majority. He approved my course, or he approved *of* my course.

An active verb, then, is one which takes after it an external limitation; a terminus ad quem, outside of the verb and without a preposition between. And usage puts that limiting word in the objective case. The neuter verb is either destitute of such a limiting word, or takes it with a preposition between.

With either kind of verb, this externally limiting noun becomes normally and frequently the subject of a passive form. But with this form, the neuter verb changes its medial preposition into a final adverb; as, He laughed at me—I was laughed at by him. She smiled on me—I was smiled on by her. These passives to neuter verbs are as normal and as well-established in English, as the passives of active verbs. The active verb has simply absorbed its preposition and thus acquired a prepositional power of its own. And thus the neuter verb and the proposition together, constitute an active verb.

But, besides this external and immediate objective, active verbs often take also an internal and adverbial objection; as, He hit me a hard blow. This internal objection is always akin in meaning, and often akin in origin with the verb that governs it, or rather that seems to govern it, for it is really a case of appositional agreement. This internal objective follows the neuter verb in the same way, and is just as much governed by it; as, To live a life, die a death, run a race, give a gift, etc. And these internal objectives, both with neuter and with active verbs, often become the subject or nominative with a passive form of the verb. And hence, many active verbs have two distinct separate passives; each in normal and well-established use; as, I was hit a hard blow, and a hard blow was hit me. Hence, too, several other deductions, which time and space forbid me now to give. M. M. CAMPBELL.

Bloomington, Ind.

WAYS IN WHICH THE SUN INFLUENCES THE EARTH.

IF we now turn to the sun, we find that there are three distinct forms of motion which animate his surface-particles. In the first place, each particle is carried round by the rotation of our luminary. Secondly, each particle is influenced by the gigantic meteorological disturbances of the surface, in virtue of which it may acquire a velocity ranging as high as one hundred and thirty or one hundred and forty miles a second; and lastly, each particle, on account of its high temperature, is vibrating with extreme rapidity, and the energy of these vibrations communicated to us by means of the ethereal medium produces the well-known light and heat effect of the sun.

Now, is it philosophical to suppose that it is only the last of these three motions that influences our earth, while the other two produce absolutely no effect? On the contrary, we are, I think, compelled, by considerations connected with the theory of energy, to attribute an influence, whether great or small, to the first two as well as to the last.

We are thus led to suppose that the sun must influence the earth in three ways, one depending on his rotation, another on his meteorological disturbance, and a third by means of the vibrations of his surface-particles.

But we have already seen that, as a matter of fact, the sun does appear to influence the earth in three distinct ways—one magnetically and meteorologically, depending apparently on his period of rotation; a second, cyclonically, depending apparently on the meteorological conditions of his surface; and a third, by means of his light and heat.—*Popular Science Monthly.*

SAID a college professor to a notorious laggard, who was once, for a wonder, promptly in his place at morning prayers, and at the appointed time: "I have marked you, sir, as punctual, this morning. What is your excuse?" "S-s-ick, sir, and could't sleep," was the reply.

ABOUT THE TYPE-WRITER.

AT the American Institute Fair, this year, one of the novelties is that strange invention called the type-writer or writing machine. "Strange," we say, for it is not an ordinary thing to conceive of a machine enabling one to put down his thoughts in black and white with type instead of the pen. Mark Twain wrote thus to an agent:

"Please do not use my name in any way. Please do not even divulge the fact that I own a machine. I have entirely stopped using the type-writer, for the reason that I never could write a letter with it to anybody without receiving a request by return mail that I would not only describe the machine, but state what progress I had made in the use of it, etc., etc. I don't like to write letters, and so I don't want people to know I own this curiosity-breeding little joker."

Assuming that some of our readers may be in a predicament similar to that of these correspondents, we will devote some space to a description of the machine.

The art of engraving and printing has been modified from year to year, and new means are constantly being developed for a more rapid transmission of thought. In the original art of writing, however, ages of ingenuity and skill have failed to make any improvement. We commit our thoughts to paper as slowly and laboriously as our grandfathers did, before time and labor saving inventions were dreamed of. We produce a written copy of a work perhaps not so rapidly as did the ancient scribes, who knew of no other way to get out an edition of a book. The spindle, the needle, sickle and other familiar implements are comparatively out of date. It has long been thought that a day must soon come for abandoning the quill, and the drudgery accompanying its use. We will not claim that the type-writer as now produced is to bring about this happy result, but it probably contains the principle which, when developed, will be the agent desired.

As to the history of this machine there is a tradition that the idea can be traced back to 1814, and is of French origin. Whoever the Frenchman was, he did not succeed in carrying his idea into a practical invention. It is said that twenty years

ago several Americans set their wits to work upon it, but without success. Hon. C. Latham Sholes, of Milwaukee, Wisconcin, devised, experimented, compared and despaired in his solitary labors. Finally, he and James Densmore, after spending $20,000, completed a machine that they dared show as a germ of something that might be brought into general use.

The type-writer, as seen in the cut, resembles the sewing machine. Writing is done by touching the keys which are arranged in four rows of eleven each, and may be operated by any finger of either hand. On each key is printed the character or letter it represents, and by depressing it the corresponding letter is printed on the paper. Any letter or character is completely transcribed in the same time and by the one motion required to bring the pen into the first position. A sheet of paper, of any width less than seven inches, is set in the machine. The type receives ink from a moving ribbon. The instrument feeds itself, the only change necessary being at the end of the line, where the stroke of a bell warns the operator to make a division of syllables. When understood, the mechanism seems quite as simple as that of a sewing machine.

SMALL CAPITALS ARE THE TYPE USED,

the work having about the appearance of the above line. The average speed is claimed to be from thirty to sixty words per minute, although there are experts who compete with stenographers. This is rapid writing, when we recall the fact that a ready pen cannot well exceed thirty words per minute. And not only this, but twenty copies can be printed at a time—a feature that may render the machine desirable for a lawyer who often needs several copies of important documents. This feature may also promote juvenile journalism, twenty copies being sufficient to gratify the boy-editor's ambition. In fact it is a useful instructor for anybody by teaching spelling, punctuation, and the construction of sentences.

One important thing is lacking. If the machine only had a thinking attachment the great multitude of poets, philoso-

phers and authors might go to sleep and let the world wag on without them. Even as it is, our conceptions of them will be changed, for no longer will portraits represent them as leaning over a desk, shouldering a quill, but propped up before an instrument, their fingers nimbly gliding over a key-board.

Whatever may be the boons conferred by the Type-Writer, chiefest among them will be legibility. An observant scholar says that the handwriting of most men has a tendency to become Shakesperian—a rude scribble, puzzling to all unfamiliar with the style. The more eminent the man, the less incumbent is it upon him to write decently, and, among a certain class, spider-sprawls penmanship ranks as an indication of genius. Horace Greeley's white hat was not more famous than his slovenly chirography. Of another editor it is related that as fast as his folios of "Leader" went to the printer, he was called upon to read it. There is an anecdote of an English author who wrote so prodigiously that some of his later creations of the brain never got into type from the sheer impossibility of himself or any other person making out the manuscript. Of Sir Archibald Allison, it may be remarked that had his "History of Europe" been given to the world in "copy," not one in a thousand would have got through the first volume in a lifetime.

Yes, typos will pay more genuine respect to the second commandment when no longer they shall strain their eyes over crazy hieroglyphics falsely called "copy."

For some purposes the pen will perhaps never be superseded. A love-letter manufactured by a machine would be robbed of its sentiment, however delicately perfumed or enveloped with the customary prodigality of paroxysmals. A scorching torrent of abuse and expletives addressed to an enemy would be as weak in type as a crytograph. The letter of a friend, or a missive from home, not in autograph, would act as a wet blanket to affection. In diplomatic correspondence, also, a printed document would be too transparent. These uses will probably remain forbidden ground.

THERE are 2,750 languages. Two persons die every second. A generation is fifteen years; average of life, thirty-one years.

COMMON SCHOOLS IN THE WEST.

BUT if the common school system has been forced to make its way slowly against the opposition of caste and sectarianism in the North and East, and was nearly banished from the South by the long prevelence of slavery, in the new States and Territories of the West and the Pacific coast it has won an almost immediate popularity. Here, among the settlers of the wilderness, its value was at once perceived. The school-house, the church, the newspaper, telegraph, and railway have grown up together. Nowhere has the American plan of education been found so perfectly suited to the wants of a progressive people. Nowhere were ever such vast and complete educational systems so rapidly perfected as in Ohio, Indiana, Illinois, Michigan, or in the newer States of Minnesota and Iowa. Through all this wide, populous and productive territory, the granary of half the world, caste and sectarianism have been laid aside forever; by a spontaneous movement of the people education has been made free to all; such great sums are lavished upon the teachers and their schools as naturally startle our European contemporaries, and the money of the people, which in Europe has been expended usually upon priests and kings, has here been devoted to the cultivation of those who earned it. Ohio spends nearly ten millions of dollars annually upon its public schools; Indiana and Illinois together a sum not much less. The fair, convenient, primary school-house shines out upon the prairie and in the forest; the higher school houses of Chicago or Cincinnati are unsurpassed in New York or Boston; the science of teaching is carefully studied in a host of teachers' institutes, and with republican liberality the West and the great Northwest care for all their children. This remarkable enthusiasm for education penetrates all the nation; it has become the distinguishing principle of American progress. In the heart of the Rocky Mountains, and in the midst of the gold and silver bearing peaks of Arizona and Colorado, the free school is the sentinel of civilization. In Tucson or Denver the love of knowledge has survived the prevalence of what is usually thought the stronger passion, and the cities of the miners are

seldom without their public school. The most splendid of our high-school buildings is said to be that of Omaha, seated on a lofty bluff over the Missouri. California has produced a system of education so complete and valuable as may well serve as a model for all older communities; its teachers are made examples of propriety and tenderness, its scholars are taught integrity and moral excellence; sectarianism and caste are forbidden to divide the people, and the prosperous State is already feeling in all its industrial pursuits the happy influence of the common school.—*Harper's Magazine.*

THE STEAM ENGINE.

OF all mechanical contrivances, the steam engine is the most interesting, important, and useful. It has contributed more benefits, and originated more enterprises than all other inventions combined.

Many indispensable objects of utility in domestic comfort and economy owe their existence to the facility of production by its convenient action. It cuts the eye and forms the point of the cambric needle, and, with like ease and certainty, shapes vast masses of cold and heated iron by a power of five hundred horses. By its hidden force, fibrous substances are converted into threads, the thread into cloth, and the cloth formed into clothing. Thus silk, wool, and hair, cotton, flax, and hemp are caused to yield their full duty in domestic usefulness and economy (when, however varied might be the substituted motive-power, without the steam engine, their present rank of value could not have been realized). It has induced the construction of railroads, for which mountains have been cut and perforated, denuding rocky strata which have developed geological wonders and wealth no other enterprises could have unfolded. The great speeds of land-travel, induced demand for improvement in transit by water, and the steam engine proved the medium desired. Those wonderful strides increasing traveling speed, demanded still more rapid means to communicate thought, prompting the electric telegraph, which, uniting distant peoples by a common indicator of ideas and language,

has so annihilated distances, as to constitute the most distant and barbarous nations of the globe our "next-door neighbors," who, casting away their traditionary intolerance of ages, seek intercourse with men who know and utilize the steam engine, proving it to be the great civilizer of the nineteenth century.

Yet this machine, employed in such varied forms, for so many uses, and daily more or less under the eyes of all classes of people, is a mystery to a vast majority of even our practical, intelligent men of business, who know little if anything of the principles of its action.

The term steam engine formerly implied the boiler and engine combined, but the custom now is, to speak of them as distinct elements. As the engine cannot be actuated without steam, it is proper that the generator of the steam should have notice in our description. The first steam generators were made from cast iron; then of copper. Now they are made from wrought iron plates riveted together; but the latest improvement in material is plates of cast steel.

Steam boilers are made cylindrical, with and without internal flues, some of which allow the flames to pass through them, and are surrounded by water, whereas others have the water inside and surrounded by fire. Some boilers are placed vertically and others horizontally.

The first essential feature in a boiler is its capacity to supply the necessary volume of steam to work the engine at a uniform pressure, with the least expense of fuel. Secondly, the requisite strength and durability against wear and tear, and thirdly, the shape and construction of a boiler for the particular duty or work it has to perform and place to occupy.

The steam engine is made up of a series of inventions, emanating from different men, and covering a long period of time. The practical working-engine of to-day is unquestionably of British origin, and divided into two distinct classes: "high pressure" and "low pressure."

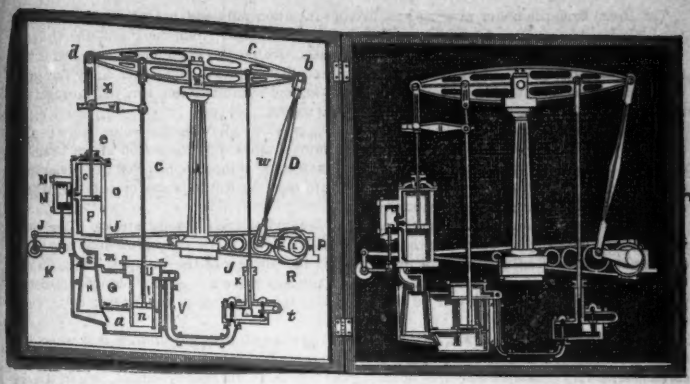
In the high pressure engine, steam from the boiler enters the cylinder, forcing the piston forward to the length of its stroke or travel, and escapes by a pipe into the air, which, weighing fifteen pounds to the square inch (and by the well-known law governing the action of fluid bodies, that force is

exerted over the whole area of the piston), has to be pushed out by the steam on the opposite or working-side of the piston. Consequently, if the necessary force to work the engine and machinery be equivalent to thirty pounds of steam to the inch, the boiler pressure must be not less than forty-five pounds to compensate for the pressure of the air. There are, however, other features, such as friction, cooling, etc., that practically enter into the calculation, but unnecessary to be noticed here. Steam that has done its engine duty, and passed from the cylinder is called "exhaust steam."

The "low pressure engine" takes steam into its cylinder as with the high pressure, but instead of allowing it to exhaust into the air, it passes to a closed space or vessel called a condenser, which converts it into water. Now as one cubic inch of water will make 1,700 cubic inches of steam, it follows that when the steam is again reduced to water in this closed area, there must be a great empty space left with *nothing* in it, not even air, and that is what is wanted so that it is *in vacuo*. When the valve or port of this cylinder opens to let out the exhaust steam, instead of its being pushed against an air pressure of fifteen pounds to the inch, it meets with this "sucking" force which draws it out of the cylinder. Hence, this engine can be worked with much less pressure than the other, requiring much less fuel to make steam in the boiler, and consequently, most economical in use for power employed, but is far more expensive to build than the low pressure machine.

There is a great variety of steam engines in use of both high and low pressure, the difference consisting in modifications of some one or more features of detail.

The annexed cut represents a working model of a low-pressure beam-engine in vertical section. It is twelve inches square and one and a-half inches deep, inclosed in a strong box or case to fit into a library shelf, like a quarto book, or into any other convenient place of deposit. The working parts are cast from type metal, and it is probably the most compact, convenient, and durable-illustrating model of the steam engine for general instruction that has been devised. The model is securely mounted upon the bottom of the box, which is lined with dark-colored cotton velvet. A crank key fits through the back, by which the engine is put in motion.



A shows a vertical supporting column, to the top of which is firmly secured a pillow block and cap *B* to receive the main journals of the working balance beam *C*, which has two other journals, *b* and *d*, on its either end. To *b* the connecting rod *D* is attached by a strap. The other end of this rod is provided with a similar strap which takes a strong pin or journal on the end of the crank *E*, which is fastened to the main driving shaft *L* that rests upon and rotates in the pillow block and cap *P*.

An eccentric plate upon the main shaft *L* is encircled by a strap *R* fast upon the eccentric rod *J* which has its opposite end attached to one arm of the rock-shaft *K*. The rotation of the eccentric gives an end to end motion of the rod *J* and the other arm of the rock-shaft *K* takes the end of the rod that causes the main steam valve to slide back and forth within the steam chest *M*.

The main steam-pipe from the boiler enters the steam-chest at *N* and the flow of the steam is governed or regulated by a kind of cock or faucet called a throttle-valve.

O shows the main steam cylinder. *P* is the piston and *e* the piston rod which takes a journal pin on the end of the link *X*, which is suspended from and actuated by the journal *d* on the end of the main oscillating beam *C*, a steam passage leads from *M* to the upper end of the cylinder, also another like passage to the bottom end with the exhaust port between them for the steam to escape after it has done its duty at either end of the cylinder. And by passages behind the cylinder and not shown in the model, the steam passes downward, escaping into the steam exhaust pipe, conducting it to the condenser *G*, through a perforated disk or rose-head.

Cold water is admitted to the pipe *S*, and a similar one *m*, for cold water to flow into the cooling chest which surrounds the condenser, and also the air pump *I*, which draws the water from *G* through the foot-valve *a*, as the pump bucket is drawn upwards by the rod *c*, which, by a link, is attached to the beam *C* by the journals thereon. *U* is the hot well, receiving water from the air pump *I*, from which it is conveyed by the pipe *V* to pump *K*, as its plunger is drawn up by the rod *w*, attached as it is to the beam *C*.

W shows a link or bar uniting the ends of the rods *c* and *e* to links connecting them with the beam *C*, and forms the celebrated parallel motion of Watt, to the steam engine, to preserve the direct action of the two piston rods *c* and *e*, in line with the cylinders *P* and *I*.

OPERATION.

We will now, for convenience, place the piston *P* near the head of the cylinder, and set the engine in motion, supposed to be by opening the steam valve or throttle in the pipe *N* gradually. The steam will dart into the steam-chest *M*, and through the port of the valve into the upper part of the cylinder, forcing the piston downwards. This will pull on the forward end of the beam *C*, and raise the other end with its connecting rod *D*, which will turn the crank *E*, and shaft *L*, supposed to be the shaft of a steamer's wheel, or main driving shaft of a factory.

You see that the shaft turns the eccentric, causing the rod *J* to move endwise and to push the arm of the rock-shaft *K*, the other arm of which, taking the valve-rod, will slide the valve *M* upwards, closing the upper steam port, and opening the lower one, at the same time changing the exhaust pipe to the upper part of the cylinder.

The steam from the boiler now rushes through the other port and passage to the bottom of the cylinder, raising the piston and pushing out the old steam from the top of the cylinder through the exhaust port into the concealed passage behind the cylinder, and thence it will pass into the pipe *Q*, and on through the perforated disk into the condenser *G*, at the same time cold water is drawn through the pipes *s* and *m*, and with the steam sprayed through the disk, mingling with the steam in converting it into water.

The air pump bucket *n*, which has a valve opening upwards allowing the water below to pass through it in its downward motion, has also been moved upward by the action of the beam *C*, drawing the water from *H* through the foot valve *a*, forcing it into the hot well *U*. Meantime, cold water has been drawn through the pipe *m*, into the cold water jacket or chest *G*, which also assists in condensing the steam into water.

The piston *P* and bucket *n* have now arrived at the end of their upward stroke. The shaft and eccentric have turned, reversing the position of the steam valve, the piston descends again causing the back end of the beam to raise and lift the plunger of the pump *I*. This draws the water from the hot well through the pipe and the foot-valve *a*. As the plunger descends on the next stroke, this water will be forced back to the boiler on to the waste, or through the pump valve and pipe *t*.

As a pint of water will make 1,728 pints, or 216 gallons of steam, it follows that when the steam is condensed or converted again into water, it will leave in a closed vessel, like this condenser, a very considerable empty space. This is called a vacuum or suction, which draws the water through *S* and *m*. The atmosphere pressure of fifteen pounds to every square inch of surface in vacuo, is equal to 2,160 pounds to a square foot.

We are describing a vertical, low pressure, or condensing beam engine, in which the condensing and air pump arrangement causes a sucking force on each side of the cylinder as the steam therefrom is exhausted, which consequently has a pulling force on the exhaust side of the piston. Whereas by cutting off the lower part of the plate and permitting the steam as it is alternatively exhausted, to pass directly into the air, we shall have a great force pushing against instead of pulling the piston—such an engine is called high pressure.

J. BURROWS HYDE.

STRATEGY AS AN ELEMENT OF SCHOOL GOVERNMENT.

IN our last MONTHLY appeared an article entitled "Memory Cultivation," from the pen of Miss N. C. Wentworth. Written in a similar vein is the following contribution to the *N. E. Journal of Education:*

The science of war teaches that in order to overcome the enemy, it is necessary to be superior to him at the point of collision, and that the object of all strategic combinations should be to act as much as possible upon the enemy's communications, or lines of operations, without exposing one's own. In the eye of every pupil the teacher is, in a measure, a natural foe—foe to his freedom of thought, of will, and of action, and the smothered fires of rebellion concealed in his breast only await the spark of a positive command (with penalty attached for disobedience), to burst into a flame that may consume the instructor's influence over the entire school. A "thus far shalt thou go" has

been the barrier over which many a "proud wave that would not be stayed" has determined to break, since the day when our mother Eve reached forth her hand to take of the fruit of which she had been warned, "In the day thou eatest thereof thou shalt die." Human nature is perverse, and out of this perversity have arisen wonderful inventions, daring explorations, and startling innovations. To dare, to do, to die, has been the watchword of heroes that have sought to tame the lightning, to utilize the power of steam, and to bring into subjection the subtle power of electricity; and that also has proved the *open sesame* to Polar seas, to torrid lands, to unknown worlds, all hitherto unexplored. The desire to surmount obstacles is innate and inextinguishable.

The teacher has not to contend against the use of this desire, but against its abuse; hence the fewer his commands the less friction there will be in the running of his machinery. "I dare you" is a favorite game among pupils, but an exceedingly dangerous game for teachers to engage in. "You shall not" has been the rock on which many a poor pedagogue's little bark has stranded. To make laws with a penalty attached is exceedingly unwise, unless the law-maker is morally certain that the punishment can be inflicted. It has been said that a teacher should have eyes in the back of his head. This may be true, but it would be the height of folly for him to use them at all times. To see too much in the school-room is as detrimental to success as to see too little. If a code of laws as irrevocable as those of the Medes and Persians be posted at the very threshold of the school-room door, the least infraction of those laws must be seen and noticed and punished. An instructor that makes rash promises to his pupils can never be certain of superiority at the point of collision, which is a requisite in strategic warfare. To illustrate:

A boy was spelling a column of words in which *a-w-n* was the dominant characteristic. He had dealt honestly with the pawnbroker, had smiled sweetly at the dawn of day, and, with St. Paul, had sawn asunder those true to the faith; but when asked to sport with the fawn upon the lawn, he had treated the fawn with contempt by substituting for the *aw*, *ah*, *au*, *ar*, and *auh*. The lesson had been given him for the sake of cultivating the idea of association of sounds, and the teacher disliked to

have it lost. So the boy was told that he would not be allowed to leave the school-room until he had spelled the word correctly. A fiendish look, which the teacher was not slow to comprehend, arose upon his face, as he said to a companion, "I'll keep her here all night!" A night in a country school-house, with a vicious boy, was not an agreeable subject for contemplation, and the folly of making such a rash threat was apparent. The teacher, therefore, put her wits to work to gain by strategy what she knew could never be obtained by force. Recess passed with the boy in his seat. Just before closing, the teacher proposed that all should choose sides. The sides were chosen, and in the excitement of spelling down, our contumacious boy fell into the trap set for him by his wily instructor. Watching for a moment of pre-occupation on his part, she gave him the word fawn. "F-a-w-n," spelled he, in a distinct voice. The laugh that went round the class convinced him that his hour of triumph was over.

The lesson was not lost upon the teacher. The ruse had been successful, but it might not be in other instances. The old adage, "A bad promise is better broken than kept," should never be allowed to enter into the arrangements of any well-ordered school-room. If a teacher would have a truthful set of pupils, he must in all things be faithful to his word.

It has been already stated that the object of strategic combinations should be to act as much as possible upon the enemy's lines of operations without exposing one's own. A case or two in point will doubtless better illustrate this statement than a page or two of dry disquisition. A child detained after school for obstinacy muttered to her teacher, "If I had your bonnet, I would tear it all to pieces!" Quietly was the bonnet reached out to her, but the disposition to rend it was gone, and the lion was a lamb. A subdued and sneaking set of pupils one day left the recitation-room of a Vermont seminary. The professor being a little late at his class, found the door barred against him. Did he scold? Did he stave in the door? Not he. He acted upon the enemy's line of operations by passing quietly to his room and never referring to the incident. How much more dignified such conduct than that of the district school-master, who, not being obeyed on calling a scholar back for leaving the room irregularly, left the house, hatless and coatless, in

unsuccessful pursuit of the miserable offender, to the amusement of the villagers and the derision of his pupils. . . .

Wise management scarcely ever fails in producing a more lasting effect than the severest method of punishment. As a body, teachers do not seem to understand this fact, but proceed in the administration of school government as though the patriarchal system, under which a man was the absolute ruler in his own household, was still in force. Absolutism is becoming obsolete. The consent of the governed must, in a measure, be gained; for what the world needs is not weaker wills, but wiser wills—wills under the control of reason and righteousness." "There may be occasions when willfulness and obstinacy and wrong must be directly met and mastered, but as a general rule, such issues are to be avoided." "Superior wisdom should be used in turning aside antagonism rather than in overcoming it."

ELEMENTARY INSTRUCTION IN LATIN.

THE Latin has been, and ever will be, the basis of language instruction. The elementary books, therefore, should be the best that care and scholarship can make. We propose to look over the productions of American authors which are in greatest request in the schools, and to consider what are the essentials of an elementary course.

The first requirement is the competency of the author. He must be *master* of the language. He must not only be able to recognize a Latin sentence when he sees one, but he must be able **to write** the language. For it is not only necessary that he should arrange and select the proper subjects, but it falls upon him to make an easy and progressive reader. This every teacher knows to be a necessity which has been most unsatisfactorily met.

To illustrate the competency of our authors in this respect, we first select ALLEN'S LATIN PRIMER. In this book we find some Latin of Mr. Allen's own composition, by which we can judge of his qualifications as fully as if he were passing his examination for "admission."

Let us first examine "THE GOLDEN EGG," a translation of Mr. Allen's from "Dream Children." The original we have not, but if any incredulity may arise in the mind of the reader as to the Latin, we assure him that it is found in the PRIMER, pages 102–5.

1. *Anus quaedam habuit gallinam, et ova aurea peperit*, p. 103, which would be in English, *An old women had a hen, and laid golden eggs.* The original probably has "and *it* laid golden eggs."

Mr. Allen, who always omits his pronouns when they are subjects, did not see that here this omission was not only ungrammatical, but also would give rise to irrepressible merriment in the class-room. The perfect *peperit* is unpardonable, an *imperfect* being absolutely required. He should have said, "*quae ova aurea pariebat.*"

2. *Gallina invenit Phoenicopterum, stantem uno in pede, altero alicubi deposito—quasi in terram defixum*, p. 103. The original was probably: "The hen found a flamingo standing on one foot—the other being hidden somewhere—as if fastened to the ground."

We notice here:

(*a*) *Uno*, instead of *altero*, because "one of two" is *alter*, not *unus*. "*Uno pede*" would indicate that the flamingo had but one foot.

(*b*) *In pede*, instead of the mere ablative. We cannot say in Latin *in pede stare*. The English *on* is only expressed by the Latin *in* when it denotes a place upon which (upon whose surface) an action is performed. The English idiom "to stand on a foot" is conceived in Latin as an ablative of means (to stand by means of a foot).

(*c*) *Altero pede deposito* would mean "the other foot being laid down," which would be another singular circumstance. For this translation we would cite Mr. Allen's Vocabulary: *deponere*, to lay down.

(*d*) *In terram defixum.* Here *in* requires the *ablative*, and the accusative is unpardonable. Thus, in a sentence of fourteen words, we have four of the worst mistakes against the grammar and lexicon.

3. *Tum gallina ausa est loqui, Salve, inquit, pace tua dicam, sed quomodo vadis uno pede?*

(*a*) The phrase "*pace tua dicam*" always begs excuse for some expression made. But for what does the hen ask excuse here? Not for "*salve.*" Nor can it be for the subsequent question, as this is placed in opposition to it by the conjunction *sed.*

(*b*) The conjunction *sed* always expresses direct opposition to the previous sentence. Here it can form no such opposition, either to "*pace tua dicam*" or to "*salve.*" The original has, perhaps, "*I beg your pardon, but how can you walk on one foot?*" This English "but" cannot be rendered in Latin by any adversative conjunction. See next paragraph.

4. *Gallina erat ignota consuetudinum mundi, aliter impudenter locuta esset*, p. 102. (The hen was ignorant of the customs of the world, else she would have been talking too impudently.)

"*Mundi consuetudines*," "the manners of the world," is not Latin. The hypothetical pluperfect subjunctive *locuta esset* is against the elementary rules of conditional periods, for the hen has really been talking, and hence the action is not contrary to fact. The whole may be thus rendered, making the sentence mentioned No. 3 a causal relative clause: *Gallina, quae ceterarum avium consuetudinum non nosset, liberius flamingonem alloqui est ausa, 'Heus tu,' inquit, 'num uno pede vadis? Miror, etc.'*

5. *Gallina, his vocibus auditis, cepit subitum consilium—unicum, paene dixerim, quod gallinis unquam venit in mentem, nisi quod pertineat ad quotidianum victum. "Ene," rogavit, "avis sapiens?"*

This sentence is faulty in many respects.

(*a*) *Consilium cepit*, "she formed a plan." But no plan is mentioned. What was it?

(*b*) *Unicum* is placed in apposition with the preceding sentence, whereas it should have been placed in the relative clause. (See the translation below.)

(*c*) The English "*ever*" cannot be rendered here by "*unquam.*"

(*d*) *Nisi* = "except" can only be used after negations, or after universals (*omnis*, etc.), but not after "*unicum.*"

(*e*) The subjunctive *pertineat* is explained in a foot-note, by a reference to R. 35 of Mr. Allen's PRIMER, which reads thus: "Conjunctions—also relatives—implying purpose or result, require the subjunctive mood." But who can discover purpose or result in the word "*which*" of the clause "a plan which refers to daily bread?" Does the author imagine that the preceding word "*consilium*" is in connection with this subjunctive?

(*f*) *Rogavit* cannot be treated like "*inquit*," by inserting it between the words of a direct quotation. "*Inquit*," which

includes "*rogavit*," should have been used here, as for instance in Cic. Ac. 1, 4, 13: *Sed de te ipso*, "*quid est*," inquit "*quod audio?*" "*Quanam*," inquam, "*de re?*"

The sentence might be expressed thus (although, without the English original, we can only *guess* at the sense): . . . *cepit consilium, quod consiliorum genus gallinis fere solum occurrere solet, ut* (or *si*) *ea praeteream* (or *praetereas*) *quae pertinent ad quaerendum victum.*

6. *Potesne igitur docere, quomodo gallina aurea pepererit ova?*

The sense of this passage is likewise obscure. Either the translator meant "Can you teach how a certain hen (the other day) laid golden eggs?" If so, we absolutely require something to indicate that an actual fact is meant, for instance: "*Potes docere* QUI FACTUM SIT *ut gallina* QUAEDAM *aurea pareret ova?*" Or the translator meant "How a hen (*i. e.*, hens in general) *may* lay golden eggs." In this instance, the perfect tense of the subjunctive (*pepererit*) is sorely out of place, a present (*pariat*) being required, where it would not make the slightest difference whether or not a perfect (has laid, should have laid) stands in the English original.

7. "*Anus quaedam habuit gallinam*—" "*Immo, intelligo*," *gallina inquit*, "*et ova aurea peperit. Sed quomodo? Haec res est.*

(*a*) *Immo* is faultily used in the sense of "yes." It means "no, on the contrary."

(*b*) *Haec res est.* The original probably has, "That is the question (matter)." But the Latin does not say "*haec res est*" in this sense. It should be, "*De hoc enim agitur* (*quaeritur*)."

8. *Consulo tibi ut discas bonos mores, respondet Flamingo;* I advise you to learn good manners.

(*a*) *Consulo* does not mean "*I advise*," but "*I take advice*," and "*consulo tibi*" means "I consult for your interest." "I advise" must be expressed by "*suadeo*" or "*admoneo.*"

(*b*) "*Discere bonos mores*" is an Anglicism. An adviser can only say "Try to learn," but not "Learn." The Latin says *operam dare*, but not *discere*, in this connection.

9. *Anus cogitabat, Singula singulis diebus haud satis est: satius erat dissecare gallinam;* The old woman thought, One (egg) a day is not enough; it would be better to dissect the hen.

(*a*) After verbs of thinking we cannot use direct quotations in Latin without any connective. It was absolutely necessary to use an infinitive clause.

(*b*) *Satis est* cannot be used as predicate of a plural substantive (*singula*, i. e., *ova*).

(*c*) Instead of *haud satis* generally *parum* must be used.

(*d*) The first part of the sentence should have been thus recast: *Anus autem singulis in die ovis contenta non erat.*

(*e*) *Satius erat* does not mean "it would be better," but "it would have been better." *Satius erit*, or *satius est* should have been used.

10. "*Ciconiae autem omnia norunt: quotannis veniunt in Septentriōnem, et de hac re narrant. Sed non huc migrant. Haec audivi quum alias peregrinabar. Ne existimāris me semper hic habitasse*" *et Flamingo superbiose circumspectavit.*"

These sentences, aside from their wretched conception and connection, contain many serious mistakes.

(*a*) Instead of *veniunt in Septemtriōnem*, the translator should have said: "*Veniunt sub septemtriones.* We cannot come *into* the seven stars of the Ursa Major, at least not with out present conveyances; nor can the *ciconiae.* Hence the Latin always says SUB *septemtriones*, to express a direction towards the North.

(*b*) *Sed non huc migrant.* Here *sed* is wrong. *Huc* is opposed to *septemtrio.* When two single words are opposed to each other, not *sed*, but either *vero* or *autem* must be used (*huc vero non migrant*).

(*c*) *Haec audivi* must be connected by *itaque.*

(*d*) Instead of *alias*, the locative *foris* should have been used, *alias* making no sense whatever.

(*e*) No Roman author, in this connection, would have used the indicative *peregrinabar*, since the hearing is represented as the consequence of the *peregrinari.*

(*f*) *Ne existimaris* should have been changed into "*noli putare.*" The Latin never uses "*ne existimâris*" if referring to the *present*, but always *noli putare* (also *noli credere*, *existimare*, etc., but far more rarely than *putare*).

(*g*) The connection "*et Flamingo*," by which a declarative sentence is coördinated with an imperative sentence, both being uttered by different speakers, is not Latin. Some such connection as "*Ad haec verba*" should have been used.

(*h*) *Superbiose* is a word of Mr. Allen's own coinage. No Latin author has ever used it. "Why not say "*superbe?*"

11. *Facile credas, gallinam meminisse ea quae ex Flamingone audierat, et nemini alteri dixisse;* You may easily believe that the hen *remembered* what she had heard from Flamingo, and that she did not impart it to any one else.

(*a*) *Credas meminisse* means "Believe that the hen remembers," but not "that the hen *remembered*;" *memini* being a perfect with present signification. It ought to have been "*memoriā tenuisse.*"

(*b*) *Et nemini* must be changed into *Neque cuiquam* (or *ulli*), the same as in English. Negations are blended with the *conjunction*, if possible.

(*c*) *Nemini alteri*, "to nobody else," is faulty. *Alter* means "the other," or "one of two." Hence "nobody else," which excludes *all* the others, must be expressed by *alius*, not by *alter*. That Mr. Allen has not the slightest idea about the meaning of *alter* may be seen from the following translation, which he gives on p. 18 as a model: *Mater ambulat cum filabus suis et alterā puellā*, "and with *another* girl."

(*d*) But the whole phrase is barbarous. The addition of "else," which is customary in English, is bad in Latin, and can be used only if we may supply a clause or phrase with "than." Nor does the Latin use the verb *dicere* in this connection, but *enunciare* (*neque cuiquam enunciavisse*). Comp. Caes. B. G., 1, 30, fin.

12. *Mane, dum ceteri hortum circumibant, ad vepres tandem pervenere.*

(*a*) *Mane* does not mean "*on the next morning*" (except in some particular connections). It should have been "*postridie autem mane.*"

(*b*) *Dum circumibant* should have been "*circumeunt.*" There is hardly an authenticated passage in classical Latin in which *dum*, in the ordinary meaning "while," stands with any other predicate than the present indicative.

(*c*) *Ceteri* has no sense here. No other subject is opposed to it.

13. *Sedebat usque dum moreretur.*

The imperfect is inadmissible here, since the action is represented as *complete* at the given time, having a definite *end*. True, Mr. Allen teaches in his Grammar that *sedebat* means "continued to sit," but he will easily see that this is not always the case.

14. *Imperat ut videat quid foret partum.*

(*a*) *Foret partum* is a bad blunder against the sequence of tenses, *videat*, the governing verb, being a present, which can-

not be followed by a pluperfect. He ought to have used a present subjunctive. The translator was misled by the English, "what would be hatched out." But he ought to know how to deal with these English potentials, or else ought not to assume the office of teaching others how to deal with them.

(*b*) The verb *parere* is utterly out of place here. *Parere* means "to bear," "to beget, to bring forth," and, in connection with "*ovum*," it means "to lay." But here the egg was *already* brought forth. He ought to have used the verb *nasci* (*ut videat quid inde nascatur*).

15. "*Vive, vale,*" *inquit gallina;* "*perlibenter manerem te auditura loquentem;*" *sed jam adveneratit*, p. 104.

(*a*). A strange mixture of misapplied constructions. *Vive, vale,* is a phrase belonging to a high style of poetry, expressing the greatest tenderness. How does this sound in the mouth of a hen? represented as extraordinarily stupid, even for a hen! And for a hen which looks for a pretext to get rid of her companion!

(*b*) *Manerem te auditura loquentem.* The periphrastic participle in *urus* should not have been used here. Mr. Allen must not think that because *auditurus* sometimes means "in order to hear," it can always be used in this sense. To employ this participle it is always necessary that the subject of the action should have the real intention to perform the action. Hence it can never be appended to a predicate which is contrary to fact, as here, *manerem;* nor to a predicate implying *command*, as p. 14, where he faultily says: *Proficiscatur tecum* NUPTURA *Isaaco.* The participle *loquentem* is an intolerable pleonasm.

All the rest of "The Golden Egg" is of the same quality throughout. Mr. Allen evidently has not learned the art of *thinking* in Latin. He does not seem to know that we cannot translate an English sentence into Latin merely by looking out every word in the dictionary. But, at all events, we might expect that one assuming to write Latin grammars and books on higher Latin composition should, at the very least, be acquainted with the rudiments of the language.

Mr. Allen has put in his PRIMER a large part of the "Epitome Historiae Sacrae" of L'Homond. Mr. Allen has frequently attempted to change the *Epitome;* yet, strange to say,

he has never exerted his ingenuity to remove its numerous blunders, but always to introduce blunders where the *Epitome* had none.

16. In the original stands: *Lenitus est dolor quem caplebat ex morte matris.* This passage is thus corrected by Mr. Allen, p. 15: *Lenitus est dolor quem* SENTIERAT *propter mortem matris*, expressly accenting the word *sentierat*, and rendering it by "had felt."

We will not find fault with Mr. Allen for his unidiomatic phrase, "*sentire dolorem propter aliquid*," which the Latin does not use, "*capere dolorem ex*" being the regular expression. But that he should be capable of forming the pluperfect *sentierat*, instead of *senserat;* that he should even mark the *i* in it with an accent, and translate the word by "had felt," and all without discovering the blunder, this should exempt Mr. Allen from serious criticism.

17. *Post mortem patris timuerunt fratres Josephi ne ulcisceretur injuriam quam acceperat; miserunt igitur*, etc.

In this passage the imperfect *timēbant* should have been used, which we indeed find in the Epitome. By correcting it into the faulty perfect *timuerunt*, Mr. Allen gives the strongest of the many proofs that he does not know the use of tenses.

18. The Epitome gives the commandment on the Sabbath thus: *Sabbato nullum opus facietis:* The Vulgate has "*Memento ut diem Sabbati sanctifices.* Mr. Allen improves thus: "*Diem Sabbati sancte agere memento*," p. 56.

Mr. Allen imagines that *meminisse*, as *verbum sentiendi*, cannot be followed by *ut*. But his version makes a wrong sense. *Meminisse*, with an infinitive, means the recollection of a *fact;* but if it is used with the force of *admoneri* (="to be admonished that something *should be done*), it, of course, requires *ut*. Hence, his correction of the Vulgate, by literally following the English authorized version, was a most unfortunate one.

19. *Apud Pharaonem plurimam potentiam habere*, p. 41.

Thus Mr. Allen has spoiled the correct phrase of the Epitome, "*apud Pharaonem plurimum posse.*"

20. *Ego poenam qua dignus est absolvam*, p. 40.

The Epitome has "*poenam exsolvam,*" which is classical and very happy, since *exsolvere* is idiomatically used of discharging another's debts. The correction into "*absolvam*" destroys this idea. Moreover, *absolvere poenam* does not occur in the meaning "to suffer punishment."

21. *Rex annulum Josephi digito imposuit*, p. 30.

This would mean that the king *laid* his ring upon Joseph's finger, which Mr. Allen did not mean to say. He has again spoiled the Epitome, which has "*annulum inseruit.*"

22. *Stetitque populus de longe* (which is rendered "far away"), p. 57.

This sentence is not found in the Epitome. Mr. Allen borrowed it from the Vulgata, without perceiving that *de longe* is bad Latin (instead of *procul*).

23. *Jacobus iterum misit filios in Aegyptum qui responderunt*, etc., p. 36.

The Epitome has, not very elegantly, but correctly: *Jacobus dixit filiis suis: Proficiscimini iterum in Aegyptum. Qui responderunt*, etc. Mr. Allen, by his correction, has destroyed the sense of "*qui responderunt*," which does not fit his "*misit.*"

24. *Compulit eos lateres facere temperantes stipula et palea pro stramentis*, p. 49.

This passage is an addition to the Epitome.

(*a*) *Compulit* (instead of *coegit*) never occurs with an object infinitive in good Latin.

(*b*) *Temperare*, which Mr. Allen renders "to mold," never occurs in this meaning.

(*c*) The participial construction with *temperantes* is used in a sense in which it never occurs in Latin.

(*d*) The whole passage, and especially "*pro stramentis*," shows a misunderstanding of the biblical narrative.

25. *Edixit ut pueri recenter nati in fluvium projicerentur*, p. 49.

The Epitome has "*Ut parvuli eorum recens nati in fluvium projicerentur.*" The two corrections applied to this sentence by Mr. Allen again show his ingenuity.

(*a*) We cannot use *puer* to designate a new-born male child in opposition to the female sex. In this sense the word *mas* must be used.

(*b*) The adverb *recenter* belongs to the latest Latinity, while *recens* in connection with *natus*, as used in the Epitome, has sufficient authority.

The passage as given in the Epitome needed correction, but in a very different direction. "*Ut parvuli nati projicerentur*" would refer only to the children already born at the time, not to those born in the future, as is expressly stated in the text of the Bible (Exodus 1 : 16). Hence the sentence should have been thus corrected, "*Edixit ut interficerentur si qui* (or *quicunque*) *mares apud eos nascerentur.*" He would then

have also got rid of the "*in fluvium projicerentur*," which old Pharaoh never commanded.

We would now give a few specimens of the blunders left uncorrected.

He has left unchanged such faulty forms as *remunerabo* (instead of *remunerabor*), p. 11; *reversus est* (instead of *revertit*), p. 6; 41; 44 and often; *miserta est* (instead of *miserita est*), p. 51. Here belongs the repeated faulty use of the reflexive and other pronouns, as *Rebecca narravit matri suae ea quae* SIBI *contigerant*, p. 13, where either *ei contigerant*, or *sibi contigissent* should have been used. Similarly, "*Fratres Josephi narraverunt patri omnia quae* SIBI *acciderant*, p. 35. So "*Num quisquam*," instead of "*num quis*," p. 30. *Quae devorarunt priores* (the former), instead of *illas*, p. 29.—Very frequently the tenses are misused in the Epitome, as: *Ecce*, INQUIEBANT, instead of *inquiunt*, p. 24. *Josephus frumentum* VENDIDIT (instead of *vendebat*), p. 33. On p. 43 he makes Jacob say to Pharaoh: *Vixi centum et triginta annos*, where the perfect *vixi* implies that Jacob was dead when he spoke so. He should have said "*Annum ago centesimum et trigesimum.*" Very frequently the moods are faultily used. On p. 44, *postquam* is construed with a subjunctive (*postquam demigrasset*), and on p. 53, *quum*, implying cause, with an indicative (*Hebraei quum videbant*). The two forms of the imperative are constantly confounded (as p. 16; p. 21).

Numerous are the instances in which the cases are used improperly, as "*Dabo posteris tuis terram cui incubas*," p. 21, where the Vulgata correctly gives "*in qua dormis.*" "*Cui incubas*" would refer only to the place covered by the body of Jacob. Sometimes words are used which are no words at all, and, moreover, have a faulty grammatical connection, as: "*Pars Benjamini erat* QUINTUPLO *major quam ceterorum*," p. 37, instead of *Portio Benjamini quinque partibus* (or *quinquies tanto*) *major erat.* The word *quintuplo* alone contains four mistakes: 1. Such a word does not exist. 2. If it existed, it would be *quincuplo.* 3. If it existed, it would have its accent on the antepenult, not on the penult, as Mr. Allen has given it. 4. At any event it cannot be used as ablative of difference. Benjamin's share *was* a quintuplum (allowing the use of the monstrous word), but it was not larger *by* a quintuplum.

The ungrammatical or improper *constructions* are too numerous to mention, as on p. 15, *Isaacus introduxit Rebecam et facta est ejus uxor*, which represents Isaac as a woman, and Rebecca as a man: "Isaac introduced Rebecca, and became his wife," reminding us of the old woman whom Mr. Allen represents as having laid golden eggs.

We have confined ourselves in this preliminary article to Mr. Allen's Latinity without having gathered the tithe of the harvest afforded by the book. But we cannot close without seriously asking the question, *Whether this is the same Joseph H. Allen whose Latin Grammar Harvard University recommends to its students, assuring them that it is sufficient for their preparation to enter upon the advanced course of that institution?*

D. T. REILEY.

CURRENT PUBLICATIONS.

IT may well be considered a difficult undertaking to prepare a text-book on any science, which shall, within reasonable limits, present clearly and concisely all the principles of that science which would be required by college students, and, at the same time, kept within such limits, or treated in such manner as to be equally available to students of lower grades.

An attractive and handy volume entitled "The Complete Algebra," * has been brought to our notice, in which the author claims to have accomplished this feat. The work appears to be the production of a thorough mathematician and a practical and successful teacher. The arrangement of the subjects differs somewhat from the ordinary treatises, and some topics are more fully and thoroughly treated, as Factoring, Radical Quantities, Quadratic and Higher Equations. The "Synopsis for Review" is an admirable feature of the book. It contains a great abundance and variety of problems.

In the words of the author, his aim has been: "1. To treat each subject in harmony with present modes of mathematical thinking. 2. To make every statement with such brevity and precision that the student cannot fail to understand the meaning. 3. To give a clear and rigorous demonstration of every

* By Joseph Ficklin, Ph. D. Ivison, Blakeman, Taylor & Co.

proposition. 4. To present *one* difficulty at a time, and just at that stage of the student's progress when he is prepared to understand its treatment. 5. To treat with special care those subjects which have been found by experience to present peculiar difficulties. 6. To make the work thoroughly practical as well as thoroughly theoretical. 7. To present each subject in such a manner as to create a love for the study."

PROF. HARVEY adds to his manuals, a little book * intended to assist beginners in expressing thought accurately and concisely. It is merely a simplified manner of presenting the principle contained in the author's "Elementary Grammar." While the attention given to errors of speech and the general freedom from technical terms are to be commended, the object of the book will not be fully realized, we think, for several reasons. It seems to smack too much of the catechism, and contains many features not in accordance with the most approved methods of interesting the young. We cannot see why the book should be encumbered with such an array of answers to be memorized by the pupil. Why not give him some opportunity for thought and originality?

THE progress in chemical science has seemed to Prof. Youmans to demand a new edition of his Chemistry. The first edition appeared in 1852; it was re-written in 1863, and now again in 1875. The latest modifications of chemical doctrine, now generally accepted, have been adopted in this work.† Among its new features is the devoting of several pages to the pronunciation of technical terms. The work deserves a careful examination by chemists.

A NEW edition of the "Students' Manual" ‡ is before us—an old friend with a new face. During the forty years since the first appearance of this book, it has been translated into many different tongues; numerous editions have been printed, and thousands of copies sold. Its eminent author also prepared the "Index Rerum,"§ which was designed for the same commend-

* "First Lessons in the English Language." By Thos. W. Harvey, A.M. Wilson, Hinkle & Co.

† "A Class-Book of Chemistry." By E. L. Youmans, M.D. D. Appleton & Company.

‡ "The Students' Manual." By Rev. John Todd, D.D. Bridgman & Childs.

§ "Index Rerum." By Rev. John Todd, D.D. Bridgman & Childs.

able purpose—that of aiding students. There can be no better recommendation for these works than the continued demand for them, which has prompted these new editions.

THE "Taxidermist's Manual"* is a neat little book whose publication will be hailed with delight by travelers, conservators of museums, and by private collectors. In a compact form, it probably embodies all the information necessary for collecting, preparing, and preserving objects of Natural History.

THE same publishers have issued another work† of similar size, designed to assist teachers and pupils in studying Scripture Geography. The book consists of sixteen maps and plans, with historical and geographical questions and answers on each map. It covers a vast field of important and useful information that should be imparted to pupils.

A SERIES of criticisms has appeared in *Scribner's Monthly* upon the modern poets and rhyme-writers of Great Britain. We are pleased to find these collected in a handsome volume,‡ which will be of no little interest in the realm of poetry-criticism. Mr. Stedman, himself a poet, treats of his fellow-authors and their works in a sympathetic but impartial manner, as it seems. While he can criticise British authors with indifference, he admits that affection and national feeling may prevent an American from writing without prejudice of Bryant, Longfellow, Whittier, and Lowell. He belongs to no particular school of poetry, but his principles are founded on the Miltonic canon. The spirit of poetry is normally the offspring of emotion, and, secondly, of thought. The traits to be earnestly deprecated are, first, obscurity and hardness; secondly, the excess of elaborate ornament. Of American poetry it can be said, that while our true poetic genius has produced charming verse of emotional, lyrical, or descriptive kind, it has never seemed inclined to compose many sustained and important works.

This volume, as an introduction to the history of English

* "The Taxidermist's Manual." By Captain Thos. Brown, F.R.S. G. P. Putnam's Sons.

† "Handbook of Scripture Geography." By Andrew Thomson. G. P. Putnam's Sons.

‡ "Victorian Poets." By Edmund Clarence Stedman. J. R. Osgood & Co.

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poetry, forms a library in itself, and cannot but give its author the reputation of a well-read, thoughtful, and able critic.

PUBLISHERS' DEPARTMENT.

Ritchie's Great National Historical Picture, "DEATH OF PRESIDENT LINCOLN," is a superb work, and worthy of a place upon the walls of any public institution or private library. Estill, the publisher, 630 Chestnut street, Philadelphia, will send a description of it on application.

Barnes doubtless means well in his October notice of "**Schermerhorn.**" But what taste he exhibits in alluding to a certain "rebuke" of the past! The educational community appreciates that rebuke even to this day. And German teachers all over the country understand now, as well as they did then, who merited the rebuke and who got it.

On a Postal Card send your address to K. V. CURTIS, 17 East 14th street, New York. Easy and Profitable Employment for the Winter explained by return.

A Timely Discourse on School Apparatus, in circular form, showing a practical way of meeting some of the wants of the school-room, is now ready, and will be mailed to any address on application, with stamp. Address J. W. Schermerhorn & Co., 14 Bond street, N. Y.

The Art of Reading Music, by Mrs. L. B. Humphreys, is meeting with enthusiastic approval wherever Mrs. Humphreys has tested its use with a class in the school-room. Her system is natural and most successful. It will enable pupils to learn to read music at sight, as readily as they learn to read the first lessons of their primers. The day is not distant when Mrs. Humphreys' plan will be recognized as revolutionizing the art of teaching music in our schools.

All interested in improved modes of Teaching Latin will do well to send their addresses to Box 3,445, New York P. O. A new and interesting pamphlet will be mailed on receipt of four cents to prepay postage.

Testimony from Scholars about Whitney's Elements of Grammar.—From W. S. Tyler, D.D., LL.D., Williston Professor of the Greek Language and Literature, Amherst College, Mass.: "Your 'Elements of Grammar' is original in its conception and method. It leaves out much that is contained in most of our English grammars, and introduces much new, not to say novel, matter in its stead; and I hardly know whether it is more to be commended for what it omits or what it introduces. It is eminently *practical* and useful, teaching by examples as well as by rules just what children and youth need to be taught in the use of their mother tongue. It is wonderfully concise and comprehensive, which, in these days of hurry and drive, is a great recommendation.

"I do not see why it should not have a wide circulation, and render a real service to teachers and students."

Rev. A. Dean, late of Auburn, N. Y., has been a member of school boards at different times, and has had a good deal to do with the examination and use of school-books. In a note to the author he says:

"Your Grammar is better than any other *elementary* grammar I have met with. I am particularly pleased with what you have to say about the 'Application of Words.' The latter portions of the Grammar are remarkably copious for an elementary grammar."

"The work is not a rehash of the old grammars, not a mere novelty, but something deserving of unbiased and careful consideration. We believe it to be just what will supply the want long felt in this department of instruction. It is the result of years of study and experience, and it has been put to the test in the school-room."—*Baptist Union.*

"It is a progressive and practical book. Its general plan is admirable; the classifications and definitions, and the treatment of the moods and tenses of verbs are excellent; and the exercises and examples given for correction are new, varied, and full."—*Boston Times.*

"It is noteworthy for its conciseness, systematic arrangement and precision in classification. The work will prove a help to teachers as well as scholars."—*Christian Intelligencer.*

"It is clear, comprehensive, and practical to both new beginners as well as old ones in this almost universal blind science of using language correctly."—*Boston Express.*

"The work deserves the examination of teachers."—*Christian Era.*